A TOXICITY STUDY ON

KANTHA CHENDRUM

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CERTIFICATE

Certified that I have gone through the dissertation submitted by **Dr. K. Benitta**, a student of final M.D.(S) BranchVI- Nanju Noolum Maruthuva Neethi Noolum of this college and the dissertation work has been carried out by the individual only. This dissertation does not represent or reproduce the dissertation submitted and approved earlier.

Place : Palayamkottai

Date :

Branch VI

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CONTENTS

INTRODUCTION

Nature and human beings are the wonderful creation of God. Pray and thank the god for creating nature, lands, water, air, resources, rain etc for living being for their better survival. It is the ultimate duty of the human beings, to protect the nature and live in harmony with nature.

Siddha system of medicine is originated from Lord Shiva, the supreme God and he is also considered to be chief of siddhar's and chief of sangam poets,

"சொல்லிடவே தேவிக்கு சதா சிவன் றான்
சொல்லவே தேவிக்கு நந்தி சொல்ல
நல்லிடவே நந்தி தன் வந்திரிக்குச் சொல்ல
நயமுடன் தன்வந்திரி யசுவனிக்குச் சொல்ல
அல்லிடவே யசுவனியாத் தேவர் தாமும்
அகத்தியர் குரைத்திடவே யம்முனிந்தரன்
புல்லிடவே புலத்தியர்க் குபதேசிக்க
புலத்தியரும் தேரையற்குப் புகன்றிட்டாரே."

யூகி வைத்திய சிந்தாமணி 800.

The siddha system of medicine was developed by the siddhars. Siddhars are not only physicians, but also social reformers.

The word siddhar is derived from the term “SIDDHI” means perfection or achievement. According to siddha system of medicine human beings and nature are inseparable and interdependent.

“அண்டத்தி லுள்ளதே பிண்டம்
பிண்டத்தி லுள்ளதே அண்டம்
அண்டமும் பிண்டமும் ஒன்றே
அறிந்துதான் பார்க்கும் போதே”.

- சட்டமுனி நிகண்டு.

The human body is composed of five basic elements called, land, air, water, fire, and ether, which maintain the integrity of nature humours called Vadha, Pitha, Kapha is fixed ratio 1:1/2:1/4.

“மிகினும் குறையினும் நோய்செய்யும் நூலோர்
வளிமுதலா எண்ணிய மூன்று”

- திருக்குறள்.

If there is rise or down in the ratio, disease will occur. The diagnosis is based upon the three dosha theory.

Siddhars have understood the relation between panchapootham, taste and uyir thathukkal.

Enippu – Appu + Prithivi

Pulippu – Prithivi + Theyu

Uppu – Theyu + Appu

Karppu – Vayu + Theyu

Kaippu – Vayu + Aagayam

Thuvarppu – Prithivi + Vayu.

Vatham – Vayu+ Aagayam

Pitham - Theyu

Kabam - Appu + Prithivi

According to the above principles siddhars prepared different medicines for different diseases. The siddha medicines basically deals the maladies with the tapping up of Herbals, minerals, and animal products. They are classified in to Agamarunthugal – 32 (Internal medicines) and Puramarunthugal 32 (External medicines).

Herbals are most widely used for the ailments. When the herbals are lesser effective for remedies, the metals and minerals are used. This could be known by the verse

"வேர்பாரு தழைபாரு மிஞ்சினக்கால் மெல்ல மெல்ல

பற்ப செந்தூரம் பாரே"

Agathiyar pininool – 80

As the metallic drugs are used, where the herbals fail, it indicates its erotic action. But the usage of which could be done, with utmost purification. The process of purifying a drug is essential and a must thing where its toxicity is overwhelmed.

Author's dissertation topic **Kantha Chenduram** is described in **Gunapadam Thathu, Jeeva vaguppu**. Kantham comes under ulogam. Kantha chenduram is particularly effective in diseases like pandu and sobai.

Any drug has got the possibility of becoming toxic, when it exceeds the prescribed dosage and duration.

In this presenting scenario,as a student of postgraduate in toxicology, it is my prime duty to prove the value of theoretical knowledge of siddha medicines through scientific experiments.

AIM AND OBJECTIVES

Kantha chenduram is the drug of choice for pandu and sobai caused by various etiologies. Nowadays many people are suffering from pandu and sobai.

Kantha chenduram is widely used in general practice by siddha physicians. So, to access its safety, the author has selected this drug for toxicological study.

The main aim of this study is to evaluate the toxic effect of Kantha chenduram on albino rats under varying conditions of drug administration.

The studies include the following

- Acute toxicity study
- Chronic toxicity study
- Haematological Investigations and Biochemical analysis of medicine Kantha chenduram.
- Histopathological study of the organs such as kidney, heart, and liver in albino rats.

MATERIALS AND METHODS

PURIFICATION:

Take required quantity of kantham. Heat the kantham in fire and soak in horse gram decoction. Repeat the process up to 7-21 times. Use fresh decoction for each process.

PREPARATION:

Purified kantham – 35 gram

Vellerukku flower juice – Required amount.

Take purified kantham, grind the kantham with vellerukku flower juice for 12 hrs. Then put pudam in usual way with 25 cow's dung cakes. Repeat the process again 3 times.

Dose:

1 or 2 குன்றிமணி எடை

130 mgm (or) 260 mgm

Anubanam:

Honey

Curable disease:

Naleer suram

Pandu

REVIEW OF LITERATURE

SIDDHA ASPECTS

Kantham is a thathu sarakku. Most of the siddha literatures are dealing, with the drug kantham and so, it shows the importance of kantham in curing the disease. All most all the siddhars in their works have stated that information about kantham, purification of kantham and its indication, for the usage with the adjuvant. Some of the siddha literatures have mentioned about the preparation of kantha vessel for the prolongation of life.

Theraiyar in his work, has stated that kantham is better than iron in curing the diseases and the same has been stated as

"இரும்பினுங் காந்தம் மேன்மை
என்பதவ் விரும்பைக் கூட
விரும்பியுள் ளடக்கிக் கொள்ளும்
மேன்மையி னாலல் லாது
பெரும்பிணி யினங்கட் கெல்லாம்
பெரும்புலி யெனவு ரைக்குந்
திரும்பவு மவைகட் கெல்லாந்
திறம்பெறு நன்பு மாமே"

The synonyms of kantham in siddha system of medicine are

சிவலோகச் சேவகன்	-	Sivaloga Chevagan
தரணிக்கு நாதம்	-	Dharanikku Nadham
சூத அங்குசம்	-	Soodha Angusam
நவலோகத் துரட்டி	-	Navaloga Thuratti
காயசித்திக்கு பாத்திரவான்	-	Kaya siddhikku paththiravan
முருகன் புராணம்	-	Murugan puranam.

CLASSIFICATION

Pramugam - "That variety which makes all kind of iron move about".

Kambagam - "That which kisses any other piece of iron"

Karshagam - "That which attracts another piece of iron.

Thiravagam - "That which can at once melt other sorts of Iron.

Romagam - "That which when broken shoots forth hair-like filaments.

Pramugam and Kambagam are useful for preparing medicine for ailment of the disease.

Karshagam and Thiravagam are very useful for the general health of the body.

Romagam is used for making Rasa kattu.

NILAM

Metal kantham is extracted from the ore magnetite. The magnetite ore are mined from the mines in the mountain. So this kantham belongs to kurinji.

KALAM

Magnetite ore is mined from the mountains through out the year. There are no specific seasons for the extraction of kantham.

SUVAI

Astringent in taste. Some sour, bitter.

VEERIYAM: Heat

ACTIONS:

- Haematinic
- Alterative
- Nutrient

In Agathiyar vaithiya rathina surukkam kantham is one of the " Thiri loga chenduram"

" கேளப்பா திரிலோகச் செந்தூரத்தைக்

கெட்டியாம் லோகமப் பிரகங் காந்தம் "

Its also one of the “Panchaloga chenduram”

“கேளடா பஞ்சலோக செந்தூரத்தைக
கேடில்லா தங்கமொடு வெள்ளி செம்பு
நாளடா காந்தமோ டிரும்பிவ் வைந்தும்
நலமாக சுத்தி செய்து சரியாய் கூட்டி”

Bohar has included Kantham as one among 120 uparasams. He has stated this as

“கண்டு கொள் ளுபரசத்தின் வகையைச் சொல்வேன்
காந்தமோ டப்பிரகந் துருசு கன்னார்.”

Common characters:

In Padhartha Guna Chinthamani, the indications for kantham have been studied as below,

“காந்தத்தாற் சோபை குன்மம் காமில மேகம்பாண்டு
சேர்ந்த திரிதோடம் வெட்டை சீதங்கால் - ஓய் ந்தபசி
பேருதரங் கண்ணோய் பிரமிய நீராமையும் போம்
ஓரினிறை யாயுளுறும் உண்.”

In the form of chenduram, kantham is very useful for following diseases as studied in Padhartha Guna chinthamani

“காந்தச் செந் தூரங் கருதரிய வுந்திவலி

போந்த வதி சாரசுரம் போவதன்றி ___ வாந்திகப

காசசு வாசவினை காமாலை பாண்டு வோடு

பூசலிடும் நோயனைத்தும் போம்”.

Pandu, Kamalai, Suram, Vaanthi, Unthivali, Athisaram,Kasa suvasam.

SUPPORTIVE DRUG

Iron, Velli, Nagam, Chembu, Pooram, Kanthagam, Thangam, Vangam, Karpooram.

NON SUPPORTIVE DRUG

Navacharam, Vediuppu, Thurusu, Apragam, Vengakaram, Venkalam, Nimilai, Veeram, Manosilai, Gowri, Silasathu, Pooneeru, Mirutharsingi.

SPECIAL CHARACTER OF KANTHAM

- Milk boiled in the magnetic vessel has the action of haematinic. When milk is boiled in the magnetic vessel it does not brim out of the vessel. This is the pivotal characteristic feature of magnet.
- The water filled in the magnetic vessel does allow the oil drop placed on the surface of it to spread.

PURIFICATION OF OTHER METHOD

a. Boil the kantham with kadineer and horse gram decoction. Then wash with water.
b. Soak the kantham in lemon juice, kadi, buttermilk respectively for 3 days and wash it.
c. Boil the kantham in lemon juice,kadi and then soak it, in the juice of cow dung for 7 times.

OTHER PREPARATION OF KANTHA CHENDURAM

I. Grind kantham with aloe (kumari) juice and put pudam in usual way with 20 cow's dung cakes. Repeat the process with each of the following juice

- Vilam pattai juice
- Murungai pattai juice
- Lime juice.

Dose: ½ to 1 grain.

Anubanam: Honey.

Curable diseases:

Butter	-	Meganoikal
Water	-	Surapinigal
Elam	-	Kaba noi
Cow's milk	-	Kasanoi
Goat's milk	-	Pakka soolai

II. Kantham - 4 பங்கு

Kanthagam - 1 பங்கு

Grind the kantham and kanthagam with erukku latex, arasampattai decoction, sirupeelai decoction, kanchori decoction. Then put the pudam in usual way. Repeat the process again for 3 times. Add half amount of lingam to the final product, grind with poonaikali decoction. Then put the pudam for 3 times.

Dose: 60-120 mg.

Anubanam: Honey

Curable disease:

Pandu

Sobai

Kamalai

Mahodharam.

III. Kantham - 8 பலம்

Lemon juice - 1 பலம்

Grind the kantham with lemon juice for 3 hrs. Next day add the lemon juice and grind for 3 hrs. Repeat the process again next day. Then put the pudam in usual way with 100 dung cakes.

Dose: 3 – 4 குன்றிமணி எடை

Anubanam: Elam, Kasa kasa, Narseeragam, Milagu powder

Curable diseases:

Pitha pandu

Sobai

Manjal Noi

Kirani,

Moola vayu.

IV.	1.	Lode Stone	-	300 gm
	2.	Sulphur	-	300 gm
	3.	Lead wort root powder	-	Sufficient Quantity
	4.	Eclipta Juice	-	Sufficient Quantity
	5.	Lime Juice	-	Sufficient Quantity
	6.	Milk	-	Sufficient Quantity
	7.	Egg Albumin	-	Sufficient Quantity
	8.	Madar latex	-	Sufficient Quantity

Grind 1 and 2 with 4 for 24 hrs, make cakes, dry and calcined. Take the product and equal weight of sulphur and grind with 4 for 24 hrs and calcine as usual. Collect the resultant final product and add equal quantity of sulphur and grind with 5, and calcine. Similarly calcine twice using milk and egg albumin for grinding each time and adding equal weight of sulphur and lead wort root powder each time. Finally grind the product with madar latex and calcine.

Take the product for use, after six calcinations. The chenduram should be blackish purple in colour.

Dose: 50 to 100 mg

Anubanam: honey with Thayir chundi choornam

Indications:

Microcytic anaemia

Anaemia

Chlorosis

Obesity

Edema

Scrotal swelling

Rheumatic diseases

Enlargement of liver and spleen.

V. Purified magnet - 4 grams

Purified Iron filings - 4 grams

Process:

Triturate in a mortar for seven and a half hrs with juice of Aloe petal, make lozenges and dry. Pack in crucibles. Burn with 20 cow dung cakes. Repeat process 7 times.

Dose: 60 to 180 mg

Anubanam : Honey

Indications:

Anaemia

Jaundice

Chlorosis

Chronic diarrhea

Myalgia.

VI. Purified Kantham - 8 gm

Finely powdered root barkers of cassia auriculata – 8 gm

Triturate together with the juices of Aloe leaf pulp for 12 hrs, make small lozenges, dry, encloses in a fled bottomed clay pot, apply a coverlid seal, burn over the hearth adjusting in moderate degrees to conflagration for 12 hrs, set aside after 12 hrs. Collect, the lozenges finely powder and store.

Dose: 30 to 120 mg

Anubanam: Honey

Indications:

A specific for spure

Chronic diarrheas

Anaemia

Chlorosis

VII. Kantham - 8 Palam

Naval pattai juice - required quantity.

Grind well kantham with naval pattai juice for 3 hrs. Make it into villais, place the villai, between 2 mud plates, and cover seelaimun. Put varaga pudam in usual way. Again the processes 3 times.

Dose: 130 to 260 mg

Anubanam: Honey

Curable disease:

Pandu

Sobai

Pasienmai

Pitha mayakkam

Pitha vayu

Kanachoodu

Other medicines prepared from kantham

Megachinthamani Chenduram

Drugs

a. Magnet, Coral, Gold leaf, Sulphur — Each 2 parts

b. Reduced mica
Mercury
} Each 5 parts

Triturate in a stone mortar gold leaf and mercury together until the mercury completely disappears and add sulphur and triturate well until everything becomes black, and the add other ingredients one by one and triturate well with the root juice of Aloe's for 10 hrs and dry within the mortar it self. Take a flask (kassi kuppi) cover it with 7 layers of clay and dry. Place the powder in the flask pack the mouth with a piece of soft slate stone and seat with clay cloth and dry.

Take a clay pot, to hold fill quarter of it with fine sand. Place in the centre the prepared flask and fill up on all sides with more sand up to the brim of the flask. Place the clay pot over hearth and burn with fire wool for 10 hrs, first low fire and gradually increase the fire. Remove the flask after it is cooled, break the glass flask and carefully scrap off the contents, place in a mortar and triturate with aloe root juice again for 10 hrs, make into lozenges, dry, and pack in clay pan, crucibles, and seal with clay cloth and burn with 10 or 12 cow dung cakes, if the quantity of the preparation is below 2 grams, or increase the cakes if it is more. Cool and see if the lozenges show any glittering of Gold, if so, repeat triturating with above root juice,

and burn with cow dung cakes until the glittering disappears which will be alright in 2 or 3 burning.

Dose: 60 – 120 mg

Anubanam : Ghee or butter

Indications :

An excellent preparation for diabetes and rebuild the saptha thaathus of the body.

Ayakantha Chenduram

Ayam	-	1 palam
Gandakam	-	1 palam
Kantham	-	¼ palam
Vengaram, Lingam, Padikaram, Pooneeru, Induppu, Navacharam, Karpooram		1/8 palam

Grind the above for 2 days with the lime juice and make small cakes and dry them in the sun. Put pudam with 50 cow dung cakes. The colour of the chenduram must be red. If the

required colour is not attained in one pudam, repeat the process twice.

Dose : 1 to 2 grains

Anubanam : Honey

Indications :

All varieties of pandu

Swayamagni Chenduram

Irumbu podi	-	4 parts
Kantham	-	8 parts
Rasam	-	16 parts
Gandakam	-	32 parts

Powder Gandakam well and add Rasam little by little, grinding each time till it mixes well and becomes black powder and add the other two and grind with Aloe juice for 6 hrs. Make a cake of it and place of, in a bronze plate and expose it to hot sun. When black fumes come out of the cake, it is the indication that the medicine is completed in its process.

Dose: 1 – 2 grains

Anubanam: Honey, ghee, seeraka churanam or chundai churanam

Indications:

Vatha Gunman

Mahodharam

Moolam

Girahani

Athisaram..

Kanthaparpam

Grind the kantham with siriyanangai juice for 3 days. Make lozenges of it and dry them in the sun, put pudam with 100 cow dung cakes.

Dose: 488 mgm

Anubanam: Chukku, Pomegranate juice

Indications:

Pandu

Chalakalichal

Piramegam

Neerchurukku

BOTANICAL ASPECTS

VELLERUKKU

According to Bentham and Hooker's classification

Kingdom	:	Vegetable kingdom
Division	:	Spermatophyta
Subdivision	:	Angiospermae
Class	:	Dicotyledonae
Subclass	:	Gamopetalae
Series	:	Bicarpellate
Order	:	Gentianales
Family	:	Asclepidaceae
Genus	:	Calatrophis
Species	:	Procera

Synonyms:

Tamil	:	Vellerukku
Siddha	:	Vellai erukku
Ayurvedha	:	Shivetarka
Eng	:	Swallow wark
Hindi	:	Safted Ak
Sanskrit	:	Alarka
Marathi	:	Mandara
Family	:	Asclepidaceae

Erect shrubs with soft, corky spongy bark. Flowers in umbrella cymes. Follicle ellipsoid.

Chemical constituents:

- Plant contains cardenolide, proceragenin
- Root bark contains benzoylinesolone and benzoylisolinelone.
- Leaves and stalks contains calotropine, calotropagenin.
- Flowers contain calotropheylacetate, steroidal, hydroxyketone procesterol, multiflavenol, cyclosadol, B sitosterol, α amyrin, β amyrin, stigmosterol.
- Latex contains uzarigenin, syriogenin proceroside.

Pothu gunam:

“வலியின் வலிகளுக்கு மாவாத சந்தி
எலியின் விஷஞ் சுரங்களெல்லாம் - வலியற்றுக்
காலைத் தொழுதே கடற்புக்கும் வெள்ளெருக்கஞ்
பாலை தொடுவாரைப் பார்”.

Uses:

- The dry leaves are either smoked or the smoke from the burning leaves is inhaled for curing asthma and cough.
- A decoction of the leaves is used for extracting taenia worms.
- The leaf juice is applied for skin diseases.

❖ The root bark is

- Chologogue
- Diaphoretic
- Emetic
- Alterative
- Diuretic

❖ The latex is used is

- Leprosy
- Taenia
- Dropsy
- Rheumatism etc.

❖ The flowers are

- Tonic
- Stomachic
- Digestive.

They are given in cough, cold, asthma etc.

The root of Calotropis procera is highly poisonous to, cobra and other poisonous snakes, which cannot stand even its smell.

CHEMICAL ASPECTS

Magnetite is a type of iron oxide with natural magnetic properties. In fact it is the most magnetic, naturally occurring mineral on earth and was once used in composes. Magnetite occurs in nearly all igneous and metamorphic rocks though usually only in small particle or in a solution with other minerals.

- **Chemical Formula** : Fe_3O_4
- **Class** : Oxides and Hydroxide
- **Group** : Spinal
- **Uses** : Major ore of iron and as mineral
- **Composition** : Molecular weight 231.54 gm

  Iron 72.36 % Fe

  31.03 % Feo

  68.07 % Fe_2O_3

  Oxygen : 27.64 %
- **Empirical formula** : $Fe^{3+}{}_2Fe^{3+}O_4$
- **Environment** : Common accessory mineral in igneous and metamorphic rocks.

- **Locality** : Many localities and Environments world wide.
- **Name of origin** : Named for Magnes, a Greek shepherd, who discovered the mineral on mountain Ida. He noted that the nails of his shoe and Iron ferrule of his staff clung to a rock
- **Synonym** : Lodestone Magnetic iron ore.

PHYSICAL PROPERTIES OF MAGNETITE

- **Colour** : Grayish black, Iron black
- **Cleavage** : None
- **Luster** : Metallic to dull.
- **Diaphaneity** : Opaque
- **Streak** : Black
- **Luminescence** : None
- **Hardness** : 5.5 – 6.5 knife Blade-Orthoclase
- **Specific gravity** : 5.17 – 5.18
- **Transparency** : Crystal are opaque
- **Crystal System** : Is isometric, 4/m bare 32/m
- Crystal habits are typically octahedrons but rarely rhomododeccehedron and other isometric forms, most

commonly found massive or granular. Twinning of octahedrons into spinal law trains is seen occasionally.

- Cleavage is absent although octahedral parting can be seen on some specimens.
- Fracture is conchoidal
- Associated minerals are talc and chlorite pyrite and hematite.
- **Other characteristics**: Magnetism stronger is massive example than in crystals, striations on crystal faces.
- Best field Indicator is magnetism, crystal habit and streak.

Iron oxides:

1. Iron II oxide (Feo) (Ferrous oxide)
2. Iron III oxide (or) ferric oxide Fe_2O_3 (Hematite) Red iron oxide
3. Iron II, III oxide (or) ferrous ferric oxide (Fe_3O_4) Magnetite – Black coloured Magnetite
4. FeO (OH) Yellow iron oxide
5. (Fe_2O_3.H2O) hydrated iron oxide yellow iron oxide.

Magnetite is another form of biological iron derived apparently from the iron in ferritin.

Heating the hydrous oxide to 200^0C, gives red brown Fe2O3. The structure comprised a hexagonally close packed lattice of O_2^- ions with Fe3+ ions in the two thirds of the octahedral holds. However, if Fe_2O_4 is oxidized Fe_2O_3 is formed which has a cubic close packed arrangement of 2^- ions randomly distributed in both the octahedral and tetrahedral sites.

Fe_3O_4 is formed as a black solid by igniting Fe2O3 at 1400^0C, Fe_3O_4 is mixed oxide. Fe^{II} $Fe_2^{III}O_4$ and has an inverse spinal structure. The O2- ions are cubic close packed with the larger Fe2+ in one quarter of the octahedral holes. $\overline{Fe_2O_3}$, $\overline{Fe_3O_4}$ all tend to be nonstorchiometic.

The oxide Fe3O4 occurs as the mineral magnetite. It is a Fe^{II} Fe^{III} mixed oxide with inverse spinal structure with Fe^{II} in octahedral interstices and Fe^{III} ions half in tetrahedral and half in octahedral interstices of a cubic close-packed array of oxide irons. The electrical conductivity is probably due to rapid valence oscillation between the Fe stir. It can be made by oxidation of

Fe^{2+} with alkaline KNO^{3} in the presence of phosphate or by reaction of acidified jocosities.

Magnetic materials are classified as

1. Dia magnetism
2. Para magnetism according to their properties in a magnetic field.

Diamagnetism is based on orbital motion of the electrons and is induced by the applied magnetic field.

Paramagnetic substances are characterized by one or more unpaired electrons, magnetization is aligned parallel to the external field.

In solid bodies, strong interaction may develop between adjacent mons. So that spontaneous magnetization results. Pure magnetic iron oxide particles used as diagnostic agent in nuclear MRI.

TOXICOLOGICAL ASPECTS

Iron Salts:

Action: Irritant

Signs and symptoms

Gastritis

Haemetemisis

Encephalopathy

Diarrhoea

Fatal dose : Uncertain

Fatal Period: Uncertain

Treatments

Gastric Lavage

Leave dilute $NaHCo_3$ in stomach

Electrolyte correction

Desferrioxamine

Medico legal point and poison sources: Accidental through over dosage.

IRON OVERLOAD DISEASES

Iron overload diseases such as Thalassemia, hemochromatosis are usually genetic and are extremely common in many part of the world. In places, such as South East Asia it constitutes a major public health problem. In Australia the gene for hemochromatosis is carried by about 1% of the population.

Iron accumulate in patients and precipitates in various part of the body in the form of iron oxyhydroxide encapsulated by the protein ferritin.

Iron is stored in the tissues in 2 forms Ferritin and Haemosiderin.

Then it leads to haemosiderosis. Accordingly the effects of haemosiderrin excess are as under.

i. Localised haemosiderosis :

This develops whenever there is haemorrhage into tissues with lysis of red cells, haemoglobin is liberated which is taken up by macrophages where it is degraded and stored as hemosiderrin.

For example

Black eye

Brown indurations lung

ii. Generalised haemosiderosis

Systemic overload with iron may result in generalized haemosiderosis.

Generalised or systemic overload of iron may occur due to following causes.

a. Increased erythropoietic activity

b. Excessive intestinal absorption

c. Excessive intake of dietary iron

Parenchymal deposits:

Liver, Pancreas, Kidney, Heart, Skin

RE cell deposits:

Liver, Spleen, Bone marrow

Transmission electron – micrograph of iron particles encapsulated in the spherical protein shell of ferritin. Each particle is about 7nm across. The iron oxide particles appear because they are electron dense.

An R2 image of an iron loaded human liver, superimposed on a T2 weighted cross sectional image of the patient: The bright region indicates areas of higher concentration. The darker areas correspond to regions of lower iron concentration.

The blood test such as serum ferritin and transferritin saturation are used for assessing the degree of iron overload in these patients, these test can be confounded by factors such as the presence of infection and inflammation. In order to make a definitive measurement of the degree of iron overload, the widely accepted method is chemical analysis of iron from liver Needle Biopsy specimen.

OTHER ASPECTS

Magnetic Therapy is complementary or an alternative way to enhance the relief of discomfort and the body's natural healing process. According to human physiology, the first thing to know is that the human body is an electromagnetic organism. Electricity flows through the nerves in our body as the same way electricity flow through an electrical wire. All cells have two magnetic poles, north and south, in their DNA.

Magnetic therapy today

Today in Japan and other Asian countries, therapeutic magnets are licensed as medical devices, Contemporary western medicine uses forms of magnetic energy for diagnosis, for example in magnetic resonance imaging (MRI), and as an aid to accelerate the healing process, following breaks and fractures in bone structure. Magnetic therapy is now gaining widespread acceptance from the US medical community (recent testimonials) and it is becoming increasingly popular among osteopaths, physiotherapists and chiropractors as a means of treating a wide range of health problems, including chronic back discomfort, arthritis, and sporting injuries.

Scientists have studies magnet therapy for the following health problems

Fracture healing

Osteoarthritis

Many types of pain

Ankle pain

Knee pain

Back pain

ANUBANAM - VEHICLE

Definition

Anubanam in abstract sense means concurrent therapy where conjoint administration of application of some specific liquid solid and semi solid drugs before, after or along with other drugs is made so that due to this combined effect gives a better therapeutic result which otherwise is impossible, is achieved. Anubanam also means those drugs that are used in combination with the main drug "Kantha chenduram is usually administered with Honey" as Anubanam.

Honey

Foraging bees start out by sucking nectar a dilute solution of sugars in flower. Then, they mix the nectar with enzymes in their stomach like honey sacs. Back at the hive, the forages pass the digested material to house bees, which reduce the moisture content of the mixture by ingesting and regurgitating it. Then they deposit concentrated drops in to honeycomb cells. New honey taken from the comb seems to be clean plate and sweet in taste.

Taste character may vary depending upon the source. Honey contains simple sugars, metals, vitamins etc. Honey is absorbed very quickly within 12 Nazhigai. Hence it gives energy

immediately. Binding of honey with the main drug also absorbed very quickly and the maximum quantity of parpam or chenduram also taken along with the honey. It is better to prescribe, the administration of bitter drugs with honey especially in children.

Actions:

1. Demulcent
2. Laxative
3. Astringent
4. Expectorant
5. Carminative
6. Hypnotic
7. Diuretic

Honey decreases the intestinal motility and promotes urination in children.

There are 5 types

1. Malai thaen
2. Kombu thaen
3. Mara bonthu thaen
4. Puttru thaen
5. Manai thaen

Among this malai thaen is the best, to be used as a vehicle.

New honey:

Indications:

It will give energy, thejas and increase the life span – In large dose dyspepsia may occur.

Old honey:

Indications:

Vatha diseases, burning sensation of abdomen, vatha moolam etc may occur. It will destroy all the good effects of the drug which we take.

Purification of Honey:

1. Commercial honey may contain wax, honey bee eggs, worm and pollens. It is filtered in wool.
2. Honey is purified by the immersion of red hot mud odu.

Uses:

1. Honey is used usually in leheyam, mezhugu etc.
2. It is the best vehicle for the administration of parpam, chenduram, choornam, tablet etc.
3. Honey has demulcent action; hence it will reduce the ulceration or gastritis which may occur by the main drug.
4. It is used as laxative. It is also used for treating indigestion, sinusitis, cough, tuberculosis.

5. It was also used for preserving the cadaver (e.g. King Alexander) hence it has the activity of preserving the body and prolongs life.
6. Honey with ghee in equal quantity may produce toxic effects.
7. Honey has an excellent antibacterial properties, that can help in healing process of sore.
8. To prevent and stop possible bacteria growth and to soothe the pain of a sore throat, take one teaspoon of honey, 3-5 times a day. Let the honey melt in the mouth first, and then swallow it slowly to coat the throat.

Characters:

It is a viscid saccharin substance, semi translucent liquid of yellow brown colour with an aromatic odour and a sweet taste.

Composition of honey:

Nutritional value per 100g

Energy 300 kcal, 1270 kj

Carbohydrates 82.4 g

- Sugars 82.12g
- Dietary fiber 0.2g

Fat 0g

Protein 0.3g

Water 17.10g

Honey is a mixture of sugars and other compounds. With respect to carbohydrates, honey is mainly fructose (about 38.5%) and glucose (about 31.0%). The remaining carbohydrates include maltose, sucrose and other complex carbohydrates.

In addition, honey contains a wide array of vitamins, such as vitamin B6, thiamin, niacin, riboflavin and pantothenic acid. Essential minerals including calcium, copper, iron, magnesium, manganese, phosphorus, potassium, sodium and zinc as well as several different amino acids have been identified in honey.

Honey also contains several compounds which function as anti-oxidants; known antioxidant compounds in honey are chrysin, pinobarksin, vitamin C, catalase, and pinicembrin. Unlike most other sweeteners, honey contains small amounts of a wide array of vitamins, minerals, amino acids and antioxidants.

The specific composition of any batch of honey will depend largely on the mix of flowers consumed by the bees that produced the honey. Honey has a density of about 1.5 kg/liter (50% denser than water) or 12.5 pounds per US gallon.

Typical honey analysis

- Fructose: 38%
- Glucose: 31%
- Sucrose: 1%
- Water: 17%
- Other sugars: 9% (maltose)
- Ash: 0.17%

The analysis of the sugar content of honey is used for detecting adulteration.

BIO – CHEMICAL ANALYSIS OF KANTHA CHENDURAM

Preparation of the extract:

100 mg of chenduram is weighed accurately and placed into a clean beaker and a few drops of conc. Hydrochloric acid and is added evaporated well. After evaporation cooled the content and added a few drops of conc. Nitric acid and evaporated it well. After cooling the content add 20ml of distilled water and dissolved it well. Then it is transferred to 100 ml volumetric flask and made up to 100 ml with distilled water. Mix well. Filter it. Then it is taken for analysis.

Qualitative Analysis:

S.No	EXPERIMENT	OBSERVATION	INFERENCE
1	TEST FOR CALCIUM: 2 ml of the above prepared extract is taken in a clean test tube. To this add 2 ml of 4% Ammonium oxalate solution is added.	A White precipitate is formed.	Indicates the presence of calcium.

2	TEST FOR SULPHATE: 2 ml of the extract is added to 5% barium chloride solution.	A white precipitate is formed	Indicates the presence of sulphate
3	TEST FOR CHLORIDE: The extract is treated with silver nitrate solution	A white precipitate is formed	Indicates the presence of chloride
4	TEST FOR CARBONATE: The substance is treated with concentrated HCL	No brisk effervescence is formed	Absence of carbonate
5	TEST FOR ZINC: The extract is added with potassium ferrocyanide	No white precipitate	Absence of zinc
6	TEST FOR IRON: Ferric: The extract is treated with glacial acetic acid and potassium ferro cyanide	Blue colour is formed	Indicates the presence of ferric iron.
6	TEST FOR IRON: Ferrous: The extract is treated with concentrated nitric acid and ammonium thiocynate.	No blood red colour is formed	Absence of ferrous iron

7	TEST FOR PHOSPHATE: The extract is treated with ammonium molybdate and concentrated nitric acid	No yellow precipitate is formed	Absence of phosphate
8	TEST FOR ALBUMIN: The extract is treated with Esbach's reagent	No yellow precipitate is formed	Absence of albumin
9	TEST FOR TANNIC ACID: The extract is treated with ferric chloride	No blue colour is formed	Absence of tannic acid
10	TEST FOR UNSATURATION: Potassium permanganate solution is added to the extract	It does not get decolourised	Absence of unsaturated compound
11	TEST FOR REDUCING SUGAR: 5 ml of Benedict's qualitative solution is taken in a test tube and	No colour change occurs	Absence of reducing sugar

	allowed to boil for 2 mts and added 8-10 drops of the extract and again boil it for 2 mts.		
12	TEST FOR AMINO ACID: One or two drops of the extract are placed on a filter paper and dried it well. After drying 1% Ninhydrin is sprayed over the same and dried it well	No violet colour is formed	Absence of amino acid.

Result:

The given sample of Kantha Chenduram contains calcium, chloride, sulphate, and ferric iron.

TOXICITY STUDY

Siddha system of medicine was introduced by the siddhars many centuries before. They prescribed medicines for both internal as well as external applications. For standardizing such medicines it is necessary to evaluate whether they possess toxic properties or not. So toxicity studies are conducted on the animals like mice, albino rats etc. While doing animal study, there are certain important things to be noted. They are given below.

While doing toxicological studies we need the help of following departments.

1. Medicinal botany and Pharmacognosy
2. Pharmacology
3. Biochemistry
4. Microbiology
5. Histopathology
6. Pharmacy
7. Animal House
8. Hospital

Selection of Animal species:

1. Usually animal experiments are conducted on mice, albino rats, rabbit and dogs. Young and immature animals should be selected for the study.
2. While selecting mice, it should be 20 – 25 gm weight and 8-12 weeks growth.
3. In case of albino rats, it should be 180-200gm weight and 12 weeks growth.
4. Virgin animals should be selected.

Preparation of animals

1. Animals should be properly caged and should be fed properly with adequate diet.
2. Allow the animals to be in the cage for 5 days before drug administration in-order to make them accustomed to the new environment.
3. The temperature maintained in the animal house should be 19˚C - 25˚C and the humidity should be 30%
4. The animal house should be 12 hrs dark and the remaining 12hrs full of light.
5. The test animal must be free from infections.

Preparation of test drug:

1. The drug should be soluble in honey, water or any other liquid. So that it may be administered orally.
2. The drug should be stable
3. The drug should be prepared whenever necessary.
4. Drug should not have hyperacidity or hyper alkalinity and high toxicity.

Preparation of the doses:

1. While doing animal study the dose of the drug given is determined on the basis of body weight of the animal.
2. In case of mice and albino rat, the dose of the drug must be 1ml for 100gm body weight.
3. When water soluble drugs are given, it must be 2ml/100gm body weight.
4. The adjuvant (anubanam) should not contain any toxicity.

PROCEDURE:

a. Administration of drug

During drug administration care should be taken that the drug does not enter into the respiratory passage. Before drug administration, the animal has to be fasted. In case of mice and albino rat` the fasting period is 3hrs and 12hrs respectively. The weight of the animal has to be noted before drug administration.

Then the drug is administered to the animal. After administration of the drug, the animal should be fed after a lapse of 1 to 2 hrs in mice and 3-4 hrs in albino rats.

b. Number of animals and dose levels

The dose of the drug given in the animal depends upon

1. Body weight of the animal, i.e. 1/8 of the human dose.
2. Metabolic rate of the animal

$$\text{Drug dose} = \frac{\text{Human dose}}{\text{Average wt of the men}} \text{ X 5-8 times animal metabolic rate.}$$

While conducting acute toxicity study the number of animals in each group should be 5+5. Animals of both sex should be used. In case of chronic toxicity study the animals are divided into 3 groups, each group consisting of 5 animals.

Observation:

In acute toxicity study, the animals are carefully observed during the first 30min and then observed for 24hrs. During that period, the animal may show changes in the skin, eye, mucous membrane, blood circulation, respiratory movements and the neurological problems may arise.

In case of sub acute toxicity study, the animals have to be observed for 28 days. For chronic toxicity study the animals have to be observed for 90 days or sometimes up to 1 year.

Some researchers conduct the chronic toxicity study for the whole life time of the animal.

Body weight of the animal:

The weight of the animal must be taken four times during the course of study.

- First before drug administration.
- 1 week after drug administration.
- Then 2 weeks after drug administration.
- Finally before sacrificing the animal.

Data and report:

At the end of the animal study, the following data's must be given.

- Number of animals selected for the study.
- Number of animals died due to the toxicity of the drug given.
- Number of animals sacrificed at the end of animal study.
- Changes in animal behaviour due to acute and chronic toxicity.
- Histopathological changes in the internal organs such as liver, kidney, heart etc.

ACUTE TOXICITY STUDY

TOXICITY STUDY

The toxicity evaluation of Kantha chenduram is carried out in two phases.

Phase I - Acute toxicity study

Phase II – Chronic toxicity study

Animals:

Wistar albino rats bred in the animal house attached to the Post Graduate, Pharmacology Department, Govt. Siddha Medical College, Palayamkottai were used.

Sex:

- Animals of both sexes were used.

Weight:

- Animals weighing between 80 – 120 gm were selected.

Food and water:

- The animals were maintained with standard animal feed and water ad-libitum.

Number of animals:

30 rats were divided into 6 groups, each group consisting of 5 rats.

Dose levels:

The following dose levels were arbitrarily fixed by presuming range of least toxic to high toxic doses.

I Group	Control
II Group	100mg/100gm body weight of animal
III Group	200mg/100gm body weight of animal
IV Group	400mg/100gm body weight of animal
V Group	800mg/100gm body weight of animal
VI Group	1600mg/100gm body weight of animal

Route of administration:

Oral administration.

Preparation of the test drug for administration:

The drug was weighed and taken. Then honey was added as a suspending agent. The mixture was ground well before the administration. The preparation was done in such a way so as 1ml of suspension contained 100mg of Kantha chenduram. The drug was administered in the morning and observed.

OBSERVATIONS:

The following details are recorded

1. **Stimulation**

- Hyper activity
- Pyloerection
- Twitching
- Rigidity
- Irritability
- Jumping
- Clonic convulsion
- Tonic convulsion.

2. **Depression**

- Ptosis
- Sedation
- Sleep
- Loss of Pinna Reflex
- Ataxia
- Loss of muscle tone
- Analgesia

3. Autonomic effects

- Straub tail
- Laboured respiration
- Cyanosis
- Blanching
- Reddening
- Abnormal Secretion

At the end of 24 hours, the number of animals live or dead in each group was noted and approximate LD 50 is tried to determine.

The tabular column was made and the results were analyzed.

TABLE NO.1

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF KANTHA CHENDURAM, AT A CONTROL DOSE.

Observation	At 1 hr	At 2 hrs	At 4 hrs	At 24 hrs
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II DEPRESSION:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	-
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO.2

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF KANTHA CHENDURAM, AT A DOSE OF 100mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	-
Loss of pinna reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
II.Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO .3

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF KANTHA CHENDURAM, AT A DOSE OF 200mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	-
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III.Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO.4

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF KANTHA CHENDURAM, AT A DOSE OF 400mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	-
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO.5

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF KANTHA CHENDURAM, AT A DOSE OF 800mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	+
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

TABLE NO.6

SHOWS THE RESULTS OF ACUTE TOXICITY STUDY OF KANTHA CHENDURAM, AT A DOSE OF 1600mg/100gm BODY WEIGHT OF ANIMAL

Observation	**At 1 hr**	**At 2 hrs**	**At 4 hrs**	**At 24 hrs**
I Stimulation:				
Hyper activity	-	-	-	-
Pyloerection	-	-	-	-
Twitching	-	-	-	-
Rigidity	-	-	-	-
Irritability	-	-	-	-
Jumping	-	-	-	-
Clonic convulsion	-	-	-	-
Tonic convulsion	-	-	-	-
II Depression:				
Ptosis	-	-	-	-
Sedation	-	-	-	-
Sleep	-	-	-	+
Loss of Pinna Reflex	-	-	-	-
Ataxia	-	-	-	-
Loss of muscle tone	-	-	-	-
Analgesia	-	-	-	-
III Autonomic effects:				
Straub tail	-	-	-	-
Laboured respiration	-	-	-	-
Cyanosis	-	-	-	-
Blanching	-	-	-	-
Reddening	-	-	-	-
IV Number of animals dead:	-	-	-	-

+ Positive sign - Negative sign

RESULT

ACUTE TOXICITY STUDY

The said parameters in acute toxicity study were observed on various six groups (Group-I, Group-II, Group-III, Group-IV, Group-V, Group-VI). Group-I is the control and Group II to VI were treated with the drug such as, 100mg, 200mg, 400mg, 800 mg, 1600mg/100 g body weight of the animal respectively. The results were tabulated in Table-I to VI.

From the Table I – VI it is being found that the drug "Kantha Chenduram" did not produce any mortality even up to 1600 mg/100 g body weight of the animal.

A very mild sign like sleep was observed only in animals treated with 800mg/100g body weight of the animal and 1600 mg/100g body weight of the animal (Group V & VI level) and that was even seen only after 24hrs.

Since it is practically difficult to give more than 1600 mg/100g body weight of the animal in this small species (Wistar albino rats), it is unable to calculate the lethal dose in this preliminary acute toxicity study.

So, it is inferred that the drug is safe up to 1600 mg/100g body weight of the animal.

CHRONIC TOXICITY STUDY

Introduction:

Kantha chenduram is used for the following conditions in siddha system of Medicine.

- Pandu
- Sobai
- Kamalai

The duration of administration was 90 days. Since the drug is usually given for a long term in chronic ailments. It was decided to find out the chronic toxicity of the drug in experimental animals.

Animals:

Wistar albino rats bred in the animal house attached to the Post Graduate, Pharmacology Department, Govt. Siddha Medical College, Palayamkottai were used.

Sex:

- Animals of both sex were used.

Weight:

- Animals weighing between 80 – 120 gm were selected.

Food and water:

- The animals were maintained with standard animal feed and water ad-libitum.

Number of animals:

15 rats were divided into 3 groups each group consisting of 5 rats.

Selection of the dose :

2 doses were selected. These doses did not have any acute toxicity effect and presumed to be safe for long term administration in animals.

I Group	Control
II Group	100mg/100gm body weight of animal
III Group	200mg/100gm body weight of animal

Route of administration:

Oral administration

Preparation of the drug for administration:

The drug was weighed and taken. Then honey was added as suspending agent. The mixture was ground well before administration. The preparation was done in such a way so as 1 ml of suspension contained 100mg of Kantha chenduram. The prepared drug was administered. The drug was administered once on the day of experiment.

Observation:

The following details were recorded before the beginning of drug administration

1. Body weight of the animals
2. Haematological Investigations
    a. WBC Total count
    b. WBC Differential count
    c. Haemoglobin %
    d. SGOT,SGPT

The above parameters were recorded at 30 days, 60 days at the end of the experiments and the results were tabulated.

The animals were sacrificed at the end of the experiment and were dissected. The viscera like Heart, Liver and Kidney were removed from each animal and were preserved in 40% formalin and sent for Histo-pathological studies.

Histopathological process:

The sections were stained with haemotoxilin and eosin and the histopathological report was given by Prof. Dr. V. Paramasivam, B.Sc., M.D. (Path), M.D. (F.M), Head of the Department, Department of pathology, Tirunelveli Medical College, Tirunelveli.

Changes in the parameters of weight and hematological indices in Group I animals (Control)

S.No	Blood	At O' day	At 30th day	At 60th day	At 90th day
1.	WBC Total	6100/cumm	6100/cumm	6000/cumm	6000/cumm
2.	Differential Count				
	Neutrophil	65%	64%	65%	63%
	Eosinophil	-	-	01%	-
	Basophil	-		-	-
	Lymphocyte	33%	36%	34%	37%
	Monocyte	-	.	-	-
3.	Haemoglobin %	11 gm	11. 4gm	11. 4 gm	11. 6gm
4.	SGOT	56IU/L	54IU/L	58IU/L	58IU/L
5.	SGPT	25IU/L	25IU/L	23IU/L	27IU/L
6.	Body Weight	100 gm	110 gm	110 gm	115 gm

Changes in the parameters of weight and haematological indices in Group II animals (100 mg/animal)

S.No.	Blood	At O' day (Mean)	At 30th day	At 60th day	At 90th day
1.	WBC Total	7790/cumm	7800/cumm	7750/cumm	7780/cumm
2.	Differential Count				
	Neutrophil	58%	60%	62%	62%
	Eosinophil	2%	2%	-	-
	Basophil	-	-	-	-
	Lymphocyte	40%	42%	42%	44%
	Monocyte	-	-	-	-
3.	Haemoglobin %	13 gm	14.2 gm	14.8gm	15 gm
4.	SGOT	57IU/L	56IU/L	57IU/L	56IU/L
5.	SGPT	23IU/L	21IU/L	22IU/L	24IU/L
6.	Body Weight	100 gm	120 gm	130 gm	135gm

Changes in the parameters of weight and haematological indices in Group III animals (200 mg/animal)

S.No.	Blood	At O' day (Mean)	At 30th day (Mean)	At 60th day (Mean)	At 90«» day
1.	WBC Total	5600/cumm	5800/cumm	5400/cumm	5800/cumm
2.	Differential Count				
	Neutrophil	58%	60%	64%	68%
	Eosinophil	2%	2%	1%	2%
	Basophil	-	-	-	-
	Lymphocyte	40%	38%	35%	30%
	Monocyte	-	-	-	-
3.	Haemoglobin %	14 gm	14.6 gm	15gm	15 gm
4.	SGOT	61IU/L	59IU/L	60IU/L	58IU/L
5.	SGPT	25IU/L	23IU/L	27IU/L	24IU/L
6.	Body Weight	100 gm	100 gm	110 gm	120 gm

HISTOPATHOLOGICAL STUDIES ON ANIMALS

[Wistar Albino Rats]

Chronic toxicity studies

Group I - control

Liver - normal

Kidney - normal

Heart - normal

Group II

The effect of Kanthachenduram at the dose of 100mgm /100 gm body weight of the animal

Liver:

Section studied shows central vein distention.

Kidney:

Section studied shows shrinkage of glomerulus with increased vascularity

Heart:

Section studied shows focal area of hemorrhage.

Group –III

The effect of Kanthachenduram at the dose of 200mgm/100gm body weight of the animal.

Liver:

Section studied show distention of central vein with RBC's and sinusoidal separation.

Kidney:

Section studied shows shrinkage of glomerulus with hypercellularity. Tubules show vacuolar degeneration.

Heart:

Section studied shows massive area of hemorrhage.

RESULT

The mean value of body weight and haematological indices for the three groups of rats, each group containing 5 animals with two different dosage levels were observed and the results were tabulated in tables I, II, III, for the control, 100mg/100gm body weight of the animal, 200mg/100mg body weight of the animal, dose groups respectively.

Haemogobin level is increased.

Histopathological studies reveal that the Kantha chenduram on long term administration produces pathological changes in the liver kidney and heart. So, the drug produces toxic effects on long term use.

SUMMARY

Kantha Chenduram is prepared according to the process found in the text **Gunapadam Thathu Jeeva vaguppu**. This well known drug is used in Siddha practices, by a large number of siddha physicians.

The aim of this dissertation is to study the acute and chronic toxicity of the drug Kantha Chenduram, administered at various presumed moderate dosage, in the experimental animals.

In review of literature, the ingredients of Kantha chenduram are discussed in depth, with focus of special features and medicinal uses, especially for diseases like Pandu, Sobai, Kamalai, Mohodharam.

The bio-chemical studies of the drug bring out the presence of Calcium, Sulphate, Chloride,and ferric iron.

The preparation of the medicine Kantha chenduram, is given in the previous chapter. The acute and chronic toxicity studies are done as follows.

The wistar albino rats of both sexes were selected from the animal house at the Government Siddha Medical College, Palayamkottai. The rats of weight 80-120 gm were fed with standard food and water.

To evaluate the acute toxicity study 30 rats were selected and divided into 6 groups, each group consisting of 5 rats and they were administered with the drug in different graded dosages up to 1600 mg animal by orally. The animals were observed and the details were recorded. The drug did not produce any mortality even up to 24 hrs, except so the drug is safe up to 1600 mg / 100 gm body weight of animal. The chronic toxicity study was conducted for about 90 days duration. In this study two dose levels were selected from acute toxicity study for the drug administration. 15 rats were selected and divided into three groups, each group consisting of 5 rats.

The first group kept as control by administered only with water. Second group was administered with Kantha Chenduram at the dose of 100mg / animal and the third group with 200 mg / animal.

The blood samples were taken before and after these studies. Periodical blood sample were taken in chronic study. Then blood samples sent to laboratory for Haematology report. Haemogobin level is increased.

The animals were sacrificed at the end of the experiment. Heart, liver and kidney were removed from rats and sent to pathologist for histopathology report.

The result reveals that the marked pathological changes in liver, kidney and heart. The result was presented in tables with relevant photos.

It is to be noted that the physicians should take precautions while prescribing the drug Kantha Chenduram regarding its dosage, anupanam, pathiyam (diet restrictions) and other principles of treatment. The dose below up to 1600 mg is safe for long term use. This is just a preliminary study and it will be useful for further researches.

DISCUSSION

The author went through the toxicity studies on albino rats for Kantha chenduram.

The present study with Kantha chenduram was conducted with an objective of finding out, whether this drug has got any side effects in long term administration to patient.

Kantha Chenduram is used to treat Pandu, Sobai,Kamalai,Mahodharam.

Depending upon the severity on the disease condition, the drug has to be administered. So the author thought to study whether this drug may produce any adverse effect in long term administration.

While studying this drug experimentally, every precaution was taken, as it is administered clinically. With this view, the drug was administered with proper adjuvant in all experiments conducted.

The details of experiment have been already given. A brief outline of the same is given below for discussion.

Acute toxicity study

The following 6 graded doses were given to animals in this study.

1. Control
2. 100 mg / 100g body weight of the animal
3. 200 mg / 100 g body weight of the animal
4. 400 mg / 100 g body weight of the animal
5. 800 mg / 100 g body weight of the animal
6. 1600 mg / 100 g body weight of the animal

As per the findings of the study it is found that the single oral doses up to 1600 mg / 100 g body weight of the animal, Kantha Chenduram did not produce any morality, even at the end of 24 hrs. The drug produced mild sleep at the end of 24 hrs of drug administration. (Group V and VI level)

Chronic toxicity study

The following 2 graded doses were given to the animals and one group is kept as control was given water in this study.

Group I - Control

Group II - 100 mg /100 gm body weight of animal

Group III - 200 mg / 100 gm body weight of animal

As per findings of long term administration of Kantha chenduram in the dose at the level of 100mg/100mg body weight of the animal and 200mg/100mg body weight of the animal produce central vein distention with RBC's and sinusoidal separation in the liver, massive area of hemorrhage in the heart, shrinkage of glomerulus with hyper cellularity, increased vascularity, tubule show vacuolar degeneration in the kidney.

Haemogobin level is increased.

The toxicity effects of Kantha chenduram was observed in chronic toxicity studies have been proved in long term use in rats. So the dose has to be reduced to smaller than dose of 100 mg for the safety of patients while long time use in future.

CONCLUSION

From the studies conducted we come to know that Kantha Chenduram did not produce death in rats with in 24 hours at the dose level of 1600 mg / 100 g body weight of the animal.

The chronic toxicity studies also revealed that the drug has harmful effect on liver kidney and heart in long term administration. The dose administered for chronic toxicity studies in rats are relatively very high, compared to the dose administered to the patients.

The aim of giving such a high dose was to find out the type of toxicity produced by it. This toxicity could occur in patient if the prescribed dose is not advised by the physician or not followed by the patient.

Further studies with smaller doses may perhaps establish the safety of the drug. In clinical practice, the drug Kantha Chenduram should be used with caution. The patient must be advised by the physician to follow correct dose (marunthalavu), course of treatment (naal alavu), adjuvant (anupanam) and diet restrictions (pathiyam).The physician should regularly monitor the patient by doing haematological examination and also the liver and kidney and the cardiac function tests.

CONVERSION TABLE – METRIC SYSTEM

நிறுத்தளலவை

ஒரு உளுந்தெடை	-	65மி.கி
ஒரு குன்றி எடை	-	130மி.கி
ஒரு மஞ்சாடி	-	260மி.கி
ஒரு மாஷம்	-	780மி.கி
ஒரு பணவெடை	-	488மி.கி
ஒரு யவம்	-	135மி.கி
ஒரு வராகனெடை	-	4.2 கி
ஒரு கழஞ்சு	-	5.1கி
ஒரு பலம்	-	35கி
ஒரு கைசா	-	10.2கி
ஒரு தோலா, ரூபா வெடை	-	12கி
ஒரு அவுன்ஸ்	-	30கி, 30மி.லி
ஒரு சேர்	-	280 கி
ஒரு வீசை	-	1.4 கி.கி
ஒரு தூக்கு	-	1.7 கி.கி
ஒரு துலாம்	-	8.5 கி.கி

முகத்தலளவை

ஒரு ஆழாக்கு	-	168 மிலி
ஒரு உழக்கு	-	336 மிலி
ஒரு உரி	-	672 மிலி
ஒரு நாழி	-	1.3லி
ஒரு குறுணி	-	5.3லி
ஒரு பதக்கு	-	10.7 லி
ஒரு முக்குறுணி	-	16.1கி
ஒரு தூணி	-	21.5லி
ஒரு கலம்	-	64.5லி
ஒரு டிரான், தேக்கரண்டி	-	4 மிலி
ஒரு குப்பி	-	700 மிலி
ஒரு தீர்த்தகரண்டி	-	1.33மிலி
ஒரு நெய்க்கரண்டி	-	40 மிலி

ஒரு அரைக்கால்படி	-	65 மிலி
ஒரு படி	-	2 லி
ஒரு உச்சிக்கரண்டி	-	16மிலி
ஒரு பாலாடை	-	30 மிலி
ஒரு எண்ணெய்கரண்டி	-	240மிலி
ஒரு சொம்பு	-	1.360 மிலி

வேறு

ஒரு அனு, திலம்	-	0.003 கி
ஒரு காகிணி	-	0.006 கி
ஒரு விரிகி	-	0.024கி
ஒரு விதலிம்	-	0.048கி
ஒரு குஞ்சம்	-	0.096கி
ஒரு தனகம்	-	3.9கி
ஒரு சாணம்	-	11.7கி
ஒரு நிட்கம்	-	46.8 கி
ஒரு வடகம்	-	23.4கி
ஒரு சுபம்	-	1225 கி
ஒரு பாரம் , ஒரு கலம்	-	2000கி
ஒரு நாழிகை	-	24 நிமிடம்
ஒரு சாமம்	-	3 மணிநேர்
ஒரு நாளுக்கு	-	8 சாமம்

புடம்

காடைப்புடம்	-	எரு1
கவுதாரிப்புடம்	-	எரு3
குக்குடப் புடம்	-	எரு10
வராக புடம்	-	எரு50
மணல் மறைவுபுடம்	-	எரு 90
கன புடம்	-	எரு 100
கெஜபுடம்	-	எரு 1000

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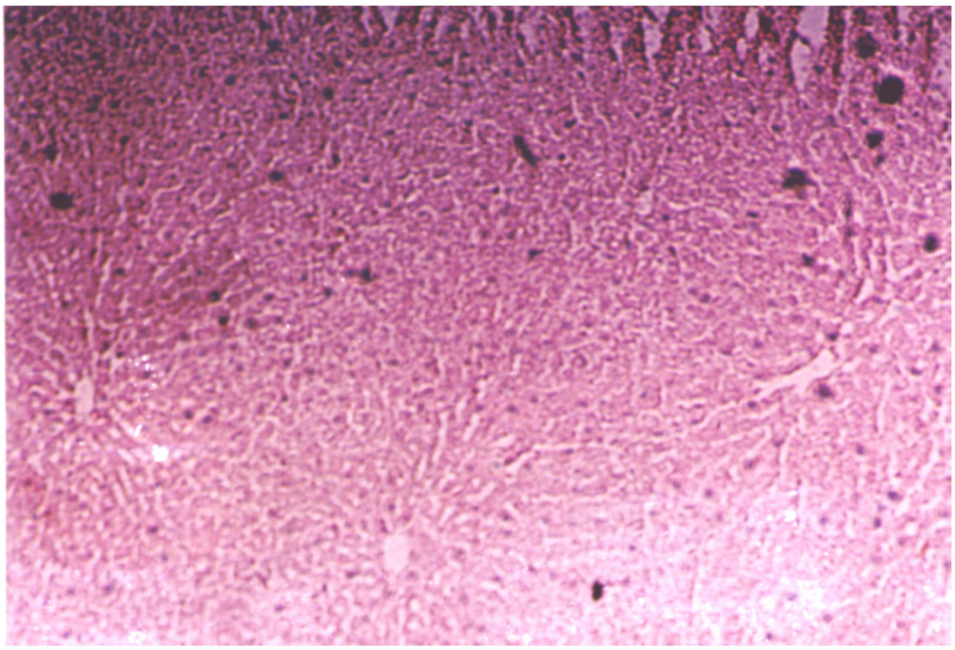
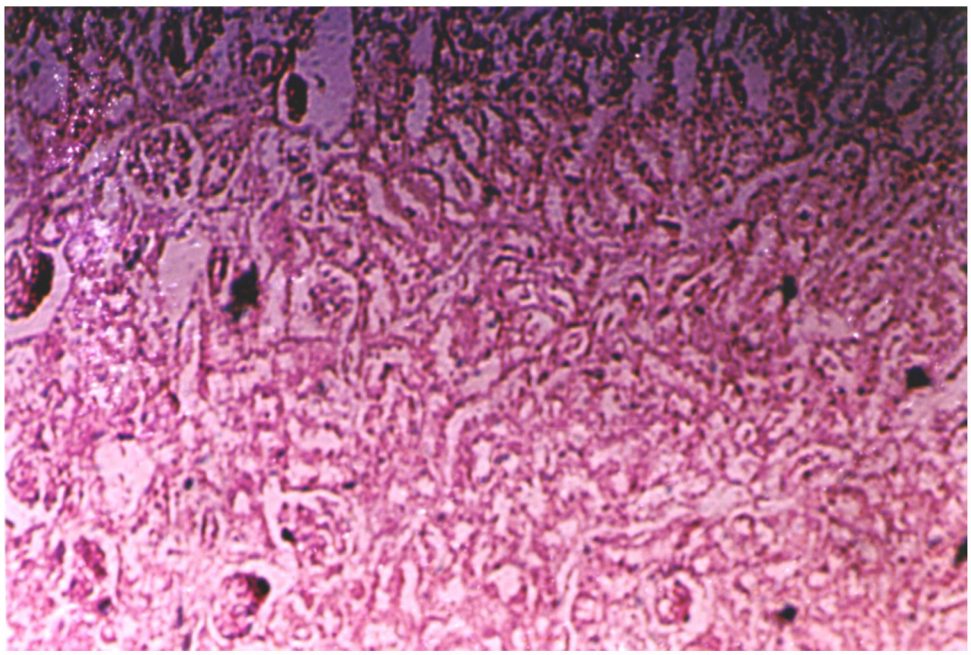
GROUP I -CONTROL

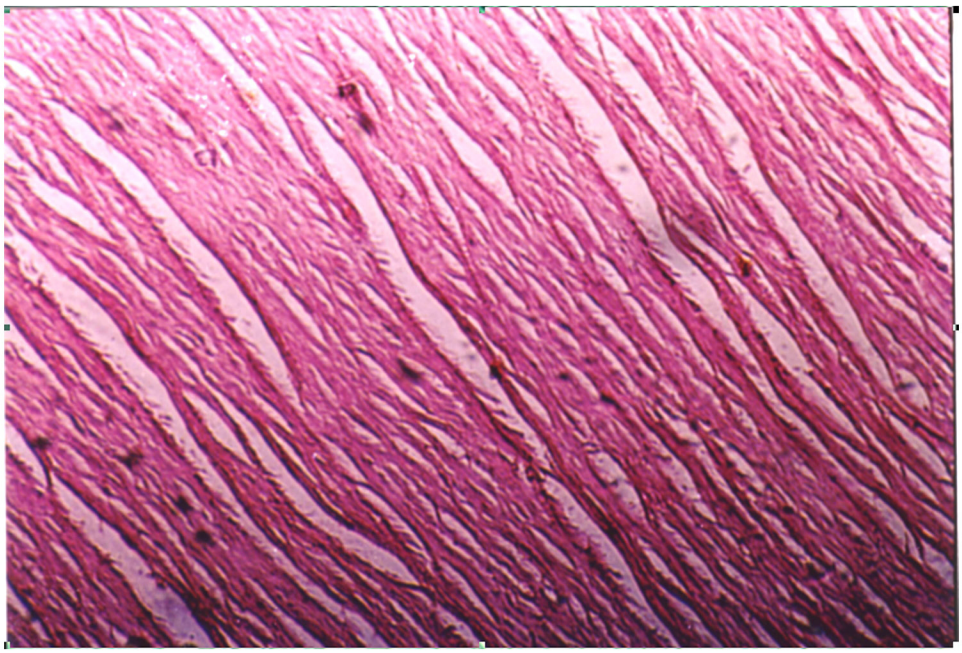


SECTION OF LIVER - NORMAL



SECTION OF KIDNEY - NORMAL

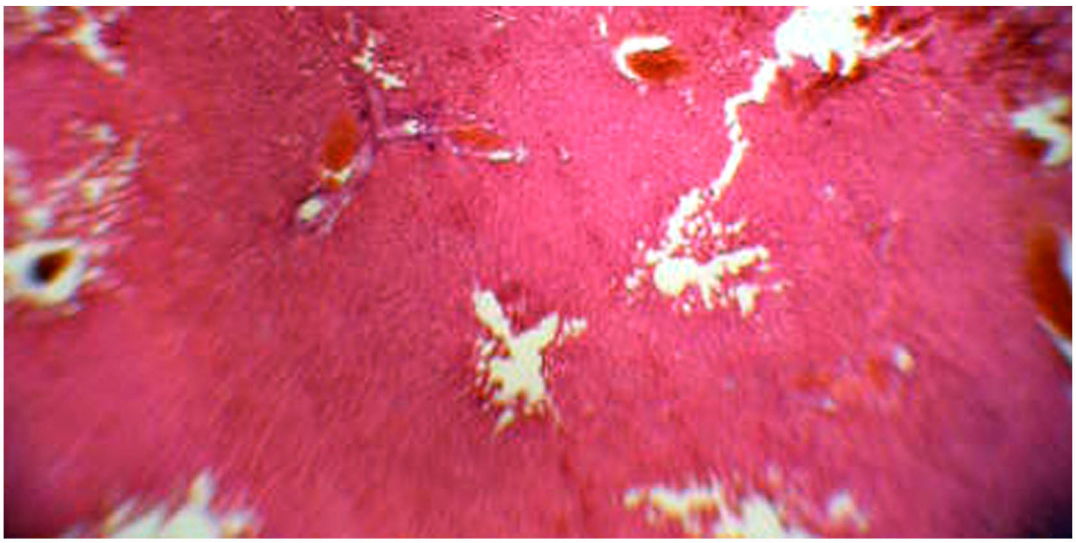
GROUP I -CONTROL



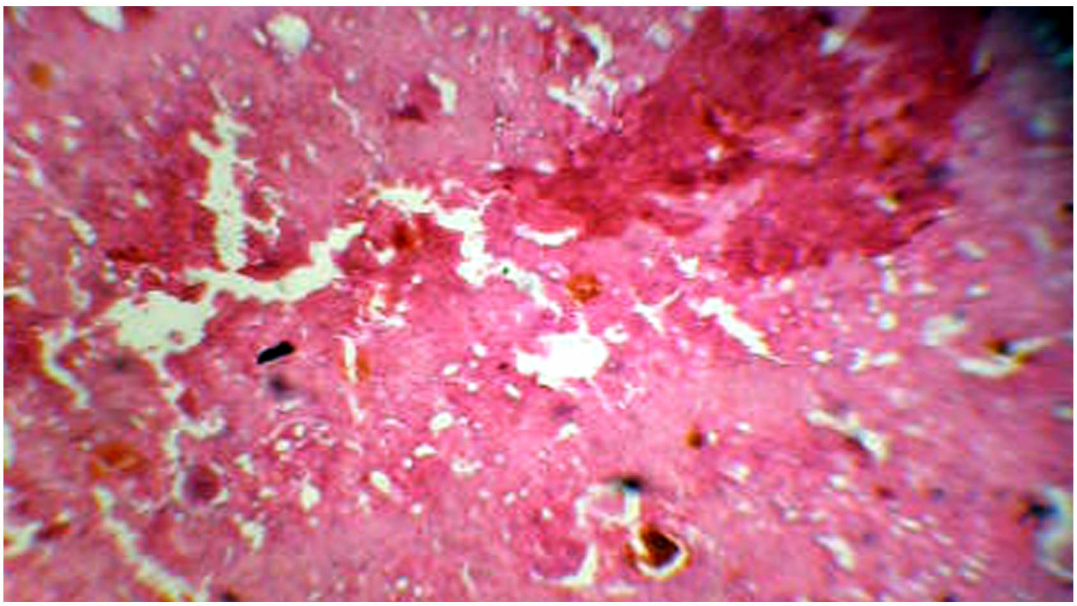
SECTION OF HEART - NORMAL

Group II

The effect of Kanthachenduram at 100mgm dose level



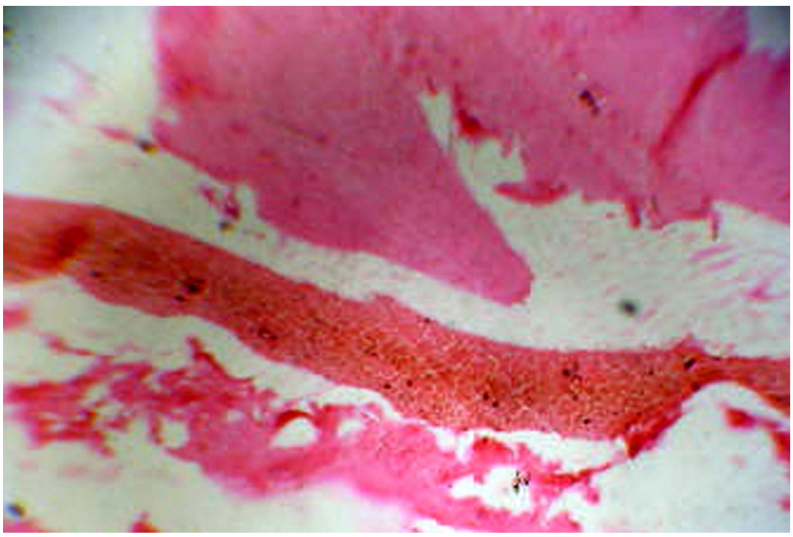
Liver - central vein distended



Kidney - Shrinkage of glomerulus with increased vascularity

Group II

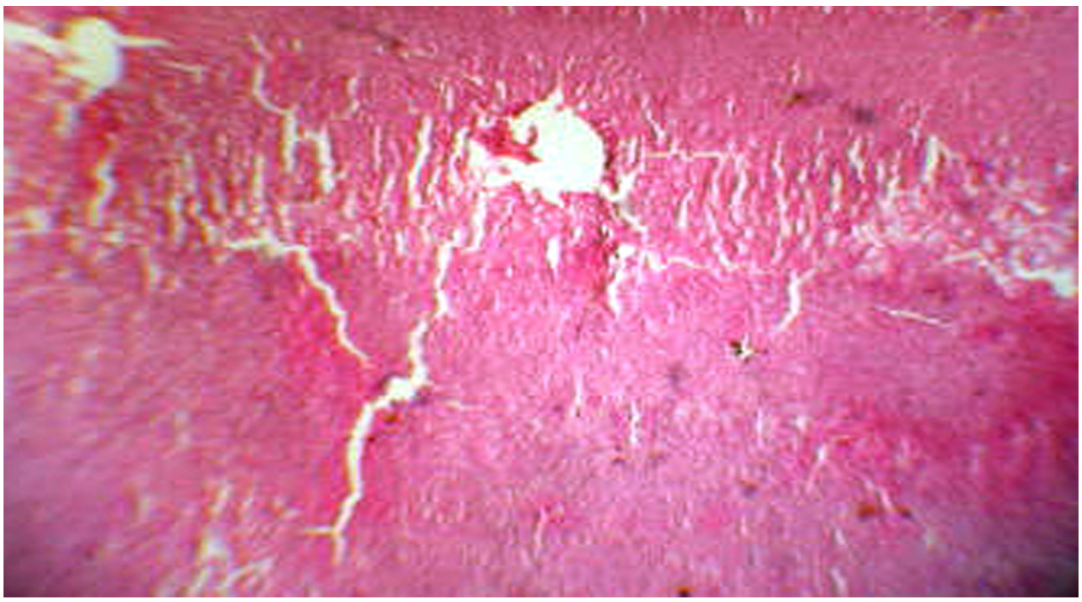
The effect of Kanthachenduram at 100mgm dose level



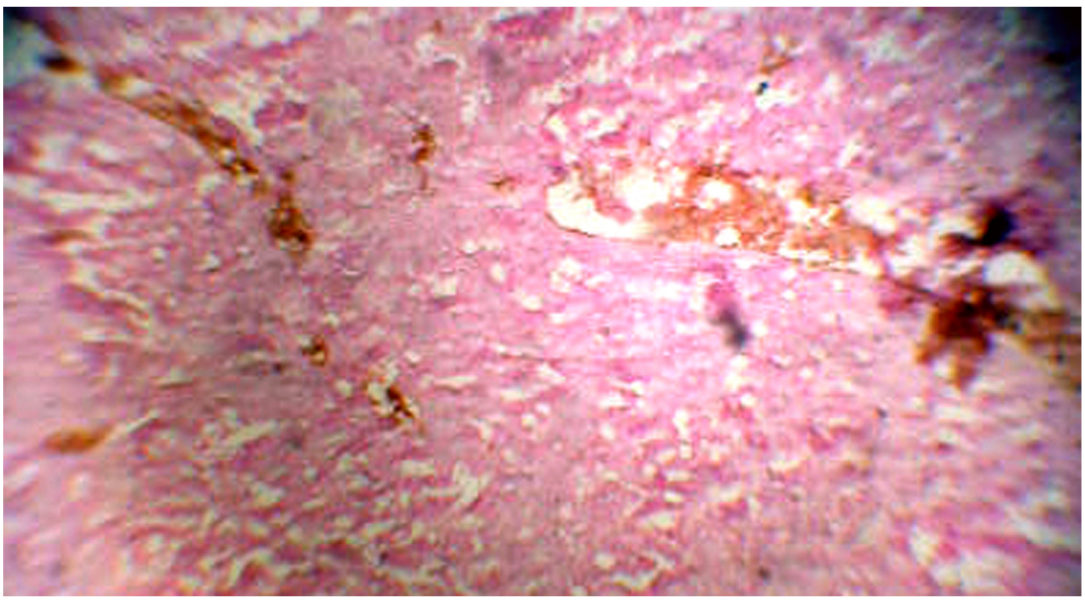
Heart - Focal area of Haemorrhage

Group III

The effect of Kanthachenduram at 200mgm dose level



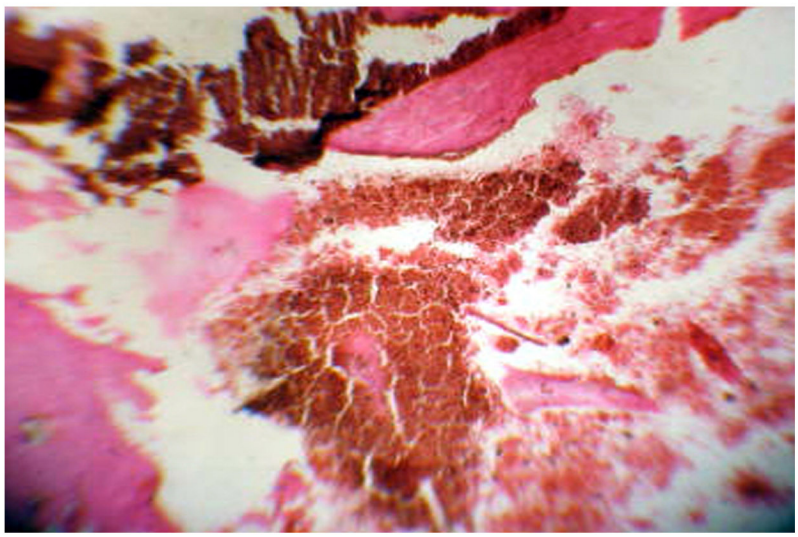
Liver - Central vein distention with RBC's and sinusoidal separation



Kidney -Shrinkage of glomerular with hyper cellularity. Tubules show vacuolar degeneration

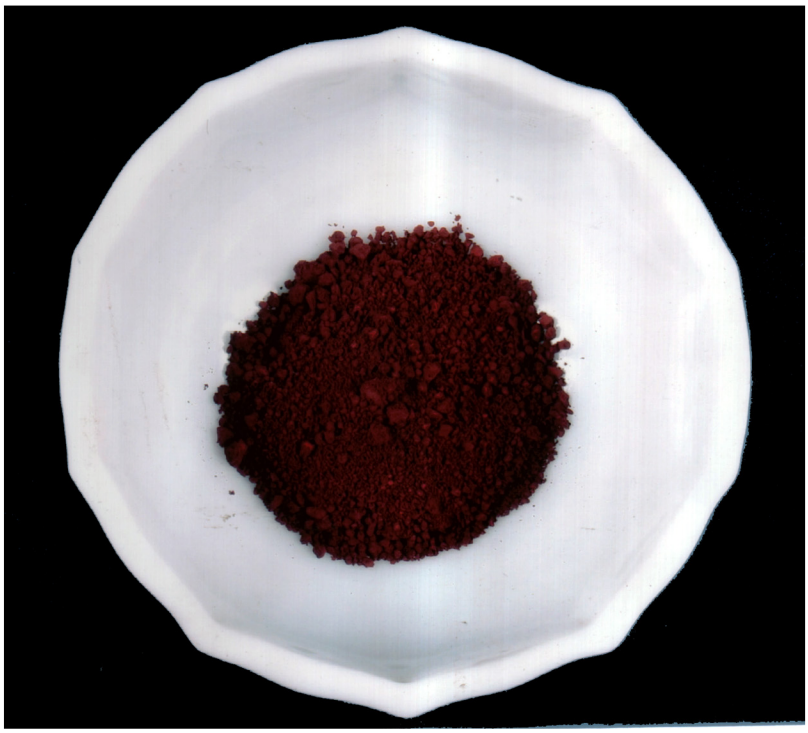
Group III

The effect of Kanthachenduram at 200mgm dose level

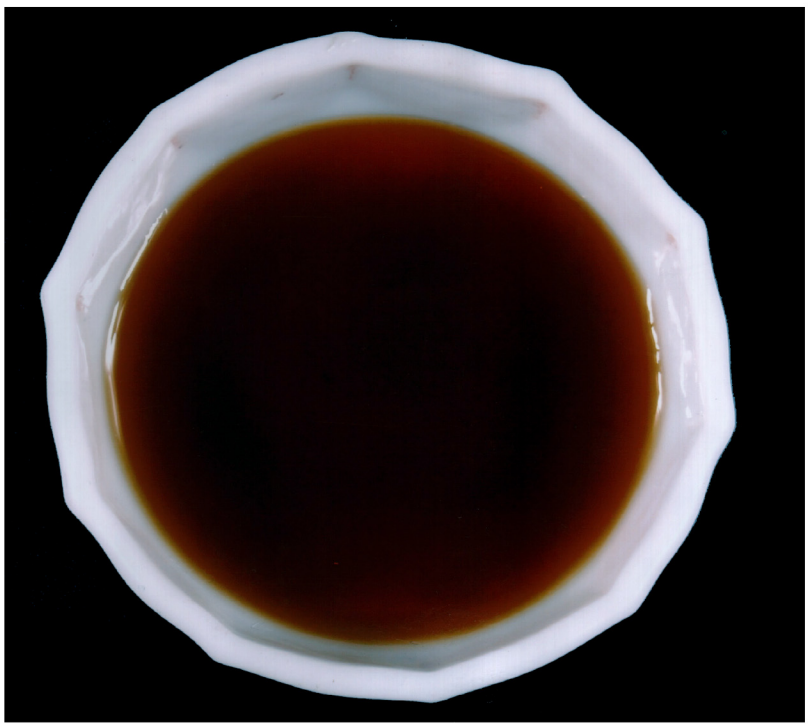


Heart - Shows massive areas of Haemorrhage

KANTHA CHENDURAM

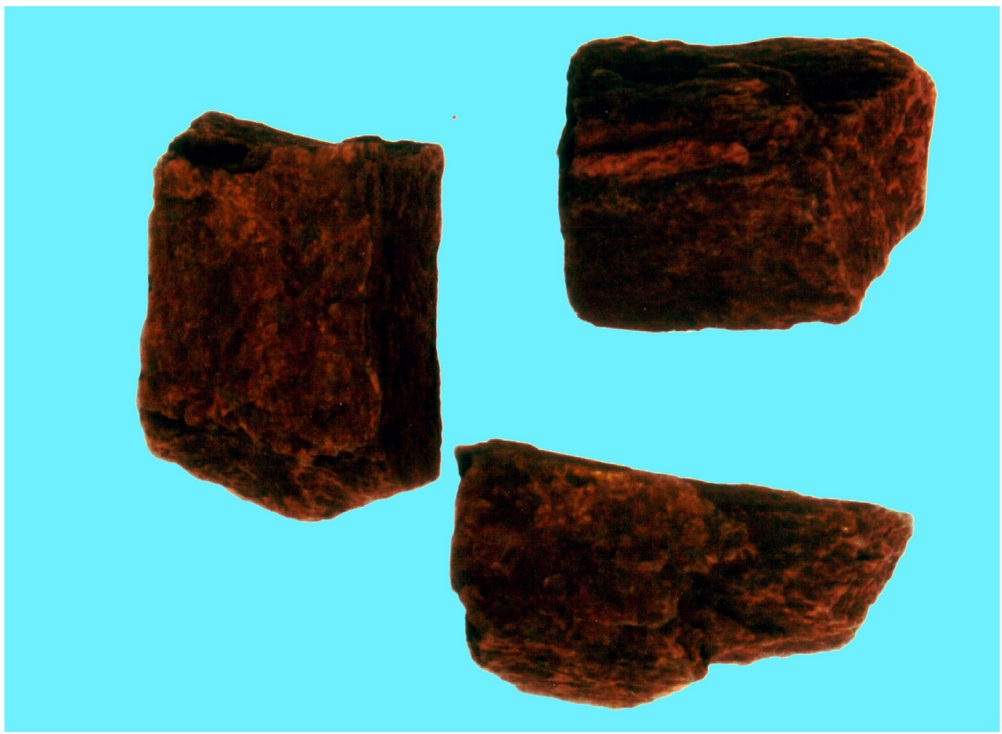


HONEY



KANTHAM

PURIFIED KANTHAM



VELLERUKKU